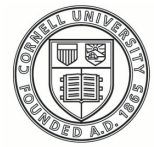

1979

Lifetime Migration in Colombia: Tests of the Expected Income Hypothesis

Gary S. Fields
Cornell University, gsf2@cornell.edu

Lifetime Migration in Colombia: Tests of the Expected Income Hypothesis

Abstract

[Excerpt] People migrate and areas gain or lose population for a variety of reasons: differences in potential earnings, in job availability, in schooling opportunities, in quality of life, proximity to friends and relatives, and so on. The economic model of migration holds that the central factor determining individual migration decisions is the perceived opportunity to attain higher economic status. Area populations are expected to change differentially according to the economic opportunities offered. In empirical research in developed countries, economic factors have been shown to underlie most migration decisions. In developing countries, where the economic situation of the populace is far more precarious, we would expect economic forces to be even more powerful determinants of the spatial allocation of the population. To test this expectation, this paper applies the economic model of migration to one developing country, Colombia.

Keywords

Colombia, labor migration, labor market, population

Disciplines

Growth and Development | International and Comparative Labor Relations | Labor Economics | Latin American Studies

Comments

Lifetime Migration in Colombia:

Tests of the Expected Income Hypothesis

Gary S. Fields

Cornell University

Population and Development Review (1979), 5(2), 247-265

People migrate and areas gain or lose population for a variety of reasons: differences in potential earnings, in job availability, in schooling opportunities, in quality of life, proximity to friends and relatives, and so on. The economic model of migration holds that the central factor determining individual migration decisions is the perceived opportunity to attain higher economic status. Area populations are expected to change differentially according to the economic opportunities offered. In empirical research in developed countries, economic factors have been shown to underlie most migration decisions.[1] In developing countries, where the economic situation of the populace is far more precarious, we would expect economic forces to be even more powerful determinants of the spatial allocation of the population. To test this expectation, this paper applies the economic model of migration to one developing country, Colombia.

To model the determinants of migration flows in Colombia from an economic perspective, we take as our starting point the expected income hypothesis. Pioneered by Michael Todaro and subsequently refined and modified by Todaro and others,[2] the expected income model of migration holds that a migrant who is a member of the labor force considers not only the income to be earned in a given area, but also the probability of obtaining employment in that area. The higher the income or the probability of employment in an area, the more migration to that area, other things being equal. Migration is the primary equilibrating force in labor markets in the expected income model, since wages do not play their ordinary equilibrating function.[3] The expected income model has gained wide acceptance among demographers and other social scientists, as well as among economists.[4]

This paper analyzes published data from the 1973 Colombian Census of population. The published information permits one to calculate rates of lifetime migration by department (an

administrative division comparable to a state or province). Male and female rates are available separately. These rates in turn are shown to be related to the department's income level, job opportunities, and employment composition.

My objective in this paper is to say what can be said from the published information about the empirical appropriateness of the economic model of migration in Colombia. Additional research now under way is using the underlying census questionnaires to build up a new, more disaggregated data base. That will allow us to take account of other factors not considered here—place-to-place population movements, rural-urban migration, differences in migration rates by education, and differential migration responsiveness for various sex/ education groups.

Data, Variables, and Hypotheses

The unit of analysis is the department. Colombia is divided into 23 departments, plus a small number of territories. Both the migration data and the economic characteristics of the labor markets in the various departments are derived from the 1973 Census of Population. The census enumerated 22.5 million people. The basis for social and economic analysis, including the statistical tables used in the present study, is a 4 percent sample of questionnaires. The census tabulations of these questionnaires have been subjected to a number of consistency checks and are judged reliable in the dimensions examined.[5]

The available migration information pertains to geographic mobility over the individual's lifetime. A lifetime migrant is defined as someone who resided in a department at the time of the census and was born in another department or outside the country. In 1973, 22 percent of the population were classified as lifetime migrants.[6]

Following the expected income hypothesis, the two principal economic characteristics of departments expected to influence migration behavior are income and job opportunities. On the former, average incomes by department were calculated for each sex.[7] These income averages refer to men and women in the labor force (though not necessarily employed in the census week) who regularly worked for wages and salaries or who were self-employed or employed others; unpaid family workers and domestic servants were thereby excluded from the income figures.

Several alternative measures of job opportunities, or employment probability, are included in the analysis. These are the unemployment rate (as a proportion of the labor force), the employment ratio (ratio of employment to total population), the proportion of full-year workers (as a percentage of employment), and the mean months worked by the labor force in the department. In addition, following the logic of the expected income hypothesis but extending Harris and Todaro's precise formulation of it, the quality of employment would also be expected to influence migration flows. Accordingly three employment composition variables—proportion white collar, proportion domestic workers, and proportion unpaid family workers—are also introduced in the analysis.[8]

The following hypotheses are tested:

Hypothesis 1. Women migrate at higher rates than men. A general characterization of migration in developing countries is that migration propensities are higher for women in Latin America and for men in Africa.[9] These differences are in part determined by social roles. In much of Africa, the women play the leading role in organizing and managing the farm household and doing the actual physical work. This frees the men to go to the cities to look for jobs. A common pattern is for the male to work in the city during the week and return home to the family farm on weekends.[10] In contrast, in Latin American countries, it is more common for teenage

girls and young women to migrate, leaving the men behind. Many women in Latin America take jobs in urban areas as personal service workers, especially in domestic service. Also, marriage is frequently mentioned as a motive stimulating female migration to relatively prosperous towns and cities.

Hypothesis 2. Women in Colombia are more responsive than men to economic opportunities associated with migration for sociological reasons; the economic incentives are greater for men than for women. Suppose Hypothesis I is true: women migrate at higher rates than men. An economist would be inclined to speculate that women's migration rates are higher because women have more to gain from making a move. On this view, the sexes would have the same propensity-to-migrate function, but women would be at a higher point along that function, as shown in Figure 1A. An alternative interpretation, assuming a more cultural mechanism, is that women's higher migration rates may be due to higher propensity-to- migrate functions, as shown in Figure IB. If the data are more accurately represented by Figure IB, the economic model of migration is disproven (or more precisely, fails to receive statistical support). In the tests of Hypothesis 2 given below, I distinguish the effects of the economic and sociological explanations. These hypotheses are not mutually exclusive; both may be operative.

Insert Figure 1 Here

The next three hypotheses offer specific tests of the expected income model of migration:

Hypothesis 3. High income areas have higher inmigration rates than do low income areas. This is the essence of the economic model of migration. It is expected that higher incomes

act to hold workers in their current locations while drawing others from elsewhere. I expect this hypothesis to hold *unilaterally*.

Hypothesis 4. Areas with fuller, more stable employment have higher rates of inmigration than do other areas. By the expected income hypothesis, actual or potential migrants respond positively to the likelihood of securing a job, as well as to the income received while working. Thus, in a multivariate relationship, after controlling for income, I would expect to find a positive correlation between rate of inmigration and probability of employment. However, the expected sign on the simple bivariate relationship-considering the influence of probability of employment on inmigration in the absence of other factors—is unclear. If the expected income model is correct, it leads to the conclusion that higher income in an area *causes* higher unemployment there because of an inflow of migrants trying to get the high-paying jobs. Thus, the areas with high lifetime inmigration rates would be those areas with both high income and high unemployment, and the simple bivariate correlation between lifetime inmigration rates and unemployment rates would be positive. But insofar as some areas have higher expected incomes than others, the bivariate correlation between inmigration rate and unemployment rate is weakened and might even become negative.

Hypothesis 5. Areas where the employment composition is relatively favorable have higher inmigration than areas with poorer job mixes. Workers presumably consider the quality of employment as well as the probability of finding work. The proportion of white-collar workers is an index of attractiveness of labor market conditions in an area (a proxy for relatively high-income, predominantly urban jobs), while the proportion of unpaid family workers is an index of unattractiveness (a proxy for relatively low-income, predominantly agricultural jobs). No specific hypothesis is advanced for the proportion of domestic servants, since there are two

offsetting effects. On the one hand, domestic service is a low-paid, unpleasant job, which is inferior to either white-collar or blue-collar work. By this reasoning alone, we would expect that if a high proportion of the labor force in a department were engaged in domestic service, this would discourage inmigration, other things being equal. On the other hand, domestic service may be one of the few options for young adults seeking to establish themselves in urban life. To the extent that domestic service is seen as a means of entry into the modern economy, the availability of such jobs might act to attract migrants.

Empirical Results

Migration Rates by Sex. The hypothesis that women in Colombia have higher rates of migration than men receives support, but only weakly. Among women, 77.6 percent were born in the same department as the one in which they were living at the time of the census, compared with 79.3 percent of men. Evidently sex-selectivity is not as important a feature of Colombian migration, at least at the department level, as it appears to be elsewhere in Latin America.

Not only are the rates highly similar, there is a remarkably high correlation between the migration patterns for the two sexes. Table 1 shows these rates by department. The correlation between men's and women's migration rates is +0.99.[11] Given the approximate parity of men and women in the population, this means that the departments that gain relatively more migrants of one sex tend to gain an approximately equal number of migrants of the other sex. This finding tends to contradict the view that is sometimes expressed that male and female migrants choose different kinds of destinations, and, in particular, that women in Colombia migrate from the farm to large cities, while the men migrate from one rural area to another. If this were the case, we

would observe men migrating disproportionately to rural departments and women tending to choose more urbanized departments: no such pattern emerges.[12]

Insert Table 1 Here

We will return to male-female migration differences after examining the relationship between migration rates and departmental economic conditions.

Migration Rates and Income Level Hypothesis 3 states that high income areas tend to have higher inmigration rates. Figure 2 is a scatter gram depicting the relationship between total lifetime migration rate (TOTALMIG) and average monthly income (TOTINC) for the 23 departments of Colombia. The simple correlation between the two is +0.69, producing an R^2 of (.69)2 = .48. The coefficient of determination (R^2) for the function is a measure of "goodness of fit." If the correlation between total lifetime migration and average monthly income were perfect (every dot fell precisely on a diagonal extending from southwest to northeast), R^2 would have a value of 1.0. The value, .48 of the coefficient in this case means that the variance in average income "explains" 48 percent of the total variation in total lifetime migration. A statistical regression fitted to the data gives the relationship:[13]

$$\underset{(.00005)}{\text{TOTALMIG} = -.072 + .0020\text{TOTINC}}, R^2 = .48$$

The coefficient .00020 means that the lifetime migration rate increases by one percentage point for each increase of 50 pesos ($= 1/.0002 \times 100$) in average monthly income. The standard error .00005 tells the standard deviation of the effect of income on migration rate. The hypothesis is strongly confirmed.

Insert Figure 2 Here

Migration Rates and Employment Probability. By Hypothesis 4, areas with fuller employment are expected to have higher lifetime inmigration rates, other things being equal. Four alternative measures of employment probability are calculated. The data for each department are plotted in Figure 3. The hypothesized signs and observed correlation coefficients are shown in Table 2.

Insert Figure 3 Here

Insert Table 2 Here

The corresponding regression results are:

$$\text{TOTALMIG} = .278 - .547\text{U}, R^2 = .04, (.650)$$

$$\text{TOTALMIG} = -.028 + .5496\text{PEMP}, R^2 = .03, (.788)$$

$$\text{TOTALMIG} = .024 + .328\text{PFULL}, R^2 = .07, (.256)$$

$$\text{TOTALMIG} = -.025 + .031\text{MEANWKYR}, R^2 = .07, (.025)$$

Each correlation and regression coefficient has the expected sign. Thus, the evidence is broadly consistent with the expected income hypothesis. However, the lack of an apparent pattern in the data, the low levels of statistical significance, and the low estimated regression coefficients[14] appear to cast doubt on the relevance of employment probability as a determinant of migration. But before coming to this conclusion, we should remember that the hypothesis

carries the restriction that, other factors being equal, a high rate of unemployment discourages inmigration. What are the other factors that must be controlled for? One obvious one is income. Controlling for the effect of income on migration rate, the partial correlations between income and the various employment probability measures are:[15]

Variable Name	Partial Correlation Coefficient with TOTALMIG (Significance Level in Parentheses)	
U	-.36	(.05)
PEMP	+.34	(.06)
PFULL	+.09	(.34)
MEANWKYR	+.05	(.41)

Thus, the deterrent effect of a high unemployment rate on inmigration appears to be confirmed at a statistically significant level by this evidence obtained from the partial correlation coefficients.[16]

To reach a judgment on the empirical applicability of the expected income model of migration in the Colombian context, we must decide whether to give more weight to the simple correlations (where the employment probability effects were insignificant) or to the partial correlations (where these variables exhibit statistically significant effects in the hypothesized direction). As stated in formulating the hypotheses, I regard the multivariate relationship as a better test of the expected income hypothesis, because the logic of the expected income model leads us to expect that higher income in an area *causes* higher unemployment there, other things being equal. Indeed, unemployment rates *are* higher in higher income areas (simple correlation coefficient = +.10). The expected income hypothesis asks whether higher unemployment discourages inmigration, other things being equal. It is more appropriate to use partial correlation coefficients to test the hypothesis under investigation than it is to use ordinary correlation

coefficients, as is more typical. Because the partial correlation coefficients exhibit the anticipated signs and are statistically significant, we have strong support for the central proposition of the expected income hypothesis—that potential migrants are attracted to an area by good opportunities of obtaining employment as well as by favorable average incomes in the area.

An examination of the multiple regression results is also revealing. Including both income and employment probability as potential independent variables explaining inmigration rates, the results are:

$$\underset{}{\text{TOTALMIG}} = .041 + \underset{(.00004)}{.00021}\text{TOTINC} - \underset{(.460)}{.786}\text{U}, \text{R}^2 = .54$$

$$\underset{}{\text{TOTALMIG}} = -.410 + \underset{(.00005)}{.00021}\text{TOTINC} + \underset{(.561)}{.897}\text{PEMP}, \text{R}^2 = .54$$

In contrast with the simple regressions, (2) and (3), a higher employment probability is found to be a statistically significant attraction for migrants.[17] Two other comparisons bear mention. One is the pattern of regression coefficients. The estimated deterrent effects of unemployment on inmigration are higher in the multivariate regressions [-.786 and +.897 in equations (6) and (7) respectively] than in the simple regressions [- .574 and +.596 in equations (2) and (3) respectively], suggesting that the estimated coefficients in the simple regressions are too small (in absolute value) due to omitted variables bias. The other comparison is the relationship between the coefficients of determination. The marginal contribution of employment probability to explaining an area's migration rate [subtracting the R^2s in (1) from the R^2s in (6) and (7)] is *greater* than the gross contribution to explanatory power [the R^2s in (2) and (3)]. This can arise only because the simple correlations and regressions mingle two offsetting influences: the effect of high income in inducing inmigration, which raises unemployment, and the effect of higher unemployment, which retards inmigration.

In sum, as hypothesized, areas with fuller employment do have higher lifetime inmigration rates, other things being equal. The expected income hypothesis is confirmed.

Migration Rates and Composition of Employment. We expect from Hypothesis 5 that migration rates are determined in part by the quality of available jobs. The three available measures of employment mix are given in Table 3. The evidence suggests that people are attracted to an area by the availability of white-collar and domestic jobs and are pushed from areas or choose not to go to areas with high proportions of family workers. These findings are in accordance with Hypothesis 5.

Insert Table 3 Here

Insert Figure 4 Here

Figure 4 depicts the scatter of points for each variable. The correlations are rather pronounced, more like the relationship between migration rate and income (Figure 2) than the relationship between migration rate and the employment probability variables (Figure 3). In each case, the responsiveness of migration to employment composition is large, as can be seen from the following simple regressions:

$$\underset{}{\text{TOTALMIG} = -.043 + 1.11\text{PWTCLR}, R^2 = .59}$$
$$(.20)$$
$$\underset{}{\text{TOTALMIG} = .296 - 1.84\text{PFAMWKR}, R^2 = .31}$$
$$(.60)$$

$$\underset{(1.53)}{\text{TOTALMIG} = .015 + 3.28\text{PDOMWKR}}, R^2 = .18$$

Taken together in a multiple regression, the multivariate analysis shows considerable strength for these variables, particularly for the percentage of white-collar workers (PWTCLR). With just the three composition variables, the results are:

$$\underset{\substack{(.32) \\ 1.99\text{PDOMWKR}, R^2 = .63 \\ (1.56)}}{\text{TOTALMIG} = .057 + 1.25\text{PWTCLR} - .40\text{PFAMWKR} -}$$

Noteworthy are the strong statistical significance of the percentage of white-collar workers and the superior explanatory power of this regression relative to any previous one. Clearly, occupational mix plays an important role in determining migration patterns in Colombia. The employment composition version of the expected income hypothesis is strongly confirmed.

Measures of average income and employment composition have been found to exhibit high explanatory power. These effects are probably not independent of one another; indeed, there is reason to suspect that TOTINC and PWTCLR are highly collinear, since the attractiveness of a white-collar occupation is determined in large part by the higher salary that such a job pays. Two pieces of evidence suggest that the multicollinearity is indeed extreme. One is the simple correlation between the two: TOTINC, PWTCLR = +.92. The other is that a multiple regression run on both sets of variables produces an insignificant income effect:

$$\underset{\substack{(.72) \\ .36\text{PFAMWKR} - 2.4\text{PDOMWKR}, R^2 = .63 \\ (1.88)}}{\text{TOTALMIG} = .048 + .00002\text{TOTINC} + 1.19\text{PWTCLR} -}$$

What this suggests is that the effects of average income and percent white-collar on migration are *not* independent of one another. Rather, good predictions of population movements can be

obtained from data on *either* the average incomes in various locations or the occupational mix of the labor force in different areas.

Determinants of Migration Rates; Male/Female Differentials. The available data permit estimation of migration functions for men and women separately using a more limited set of variables. We have sex- specific data on migration rates, average incomes, unemployment rates, and employment-to-population ratios.

Correlation coefficients among these variables are shown in Table 4. Variable code names are as before with the addition of a suffix for male (M) or female (F). As previously observed, the lifetime migration rates for the two sexes are remarkably similar (TOTMIGM, TOTMIGF = + .992), On the other hand, the data indicate that economic conditions across departments differ appreciably for men and women. We find an imperfect correlation between males' and females' incomes (rINCTOTM, INCTOTF = +.782) and unemployment rates (rUM, UF = +.818) and an even weaker correlation between the two sexes' employment ratios (rPEMPM, PEMPF = +.228). This raises the possibility' that male and female migration may be responsive to somewhat different stimuli.[18]

Insert Table 4 Here

Our hypothesis (number 2) is that women are more responsive than men to economic opportunities associated with migration. If the socio logical version of this hypothesis is correct, men and women will be found to have different propensity-to-migrate functions. Thus, we would expect to find that the coefficients on the explanatory variables (TOTINC and U or PEMP) are

larger (in absolute value) for women than for men, if indeed the expected income hypothesis holds at all. The respective regression results when the employment probability measure is U are:

$$\underset{}{\text{TOTMIGF}} = \underset{}{.118} + \underset{(.00009)}{.00036}\text{TOTINCF} - \underset{(.28)}{.76}\text{UF}, \text{R}^2 = .50$$
$$\underset{}{\text{TOTMIGM}} = \underset{}{.053} + \underset{(.00006)}{.00019}\text{TOTINCF} - \underset{(.64)}{1.03}\text{UM}, \text{R}^2 = .49$$
$$\underset{}{\text{TOTMIGF}} = \underset{}{-.342} + \underset{(.00009)}{.00035}\text{TOTINCF} + \underset{(.28)}{1.49}\text{PEMPF}, \text{R}^2 = .47$$
$$\underset{}{\text{TOTMIGM}} = \underset{}{-.506} + \underset{(.00004)}{.00018}\text{TOTINCM} + \underset{(.62)}{1.11}\text{PEMPM}, \text{R}^2 = .51$$

when the employment probability measure is PEMP. These results show that the expected income model of migration applies to both sexes. In addition, the women's coefficients are in fact found to be higher than men's,[10] Thus, the sociological explanation underlying Hypothesis 2 receives support: men's and women's migration rates differ in Colombia in part because women have a higher propensity to migrate in response to a given spatial difference in economic opportunity than do men.

What about the economic hypothesis? Regressions (13)—(16) show that women's migration functions start above those for men and are substantially steeper. Why then are women's migration rates only slightly higher than men's? The answer lies in the interdepartmental income structure. The mean income (unweighted) in the 23 departments is 1,316 pesos per month for men and 1,073 pesos for women. The standard deviation and coefficient of variation are also larger for men (444 and .34 respectively) than for women (226 and .21). That is, both in an absolute and in a relative sense, men in Colombia have more to gain from interdepartmental migration than do women.[20] This acts to offset women's higher propensities to migrate in response to any given dollar gain. The net effect is to produce quite similar migration rates for the two sexes.

These relationships are illustrated in Figure 5. These findings provide a clearer insight into the behavior underlying sex differences in Colombian migration. Both sociological and economic factors are at work.

Insert Figure 5 Here

Conclusions

This paper has explored the determinants of population migration in Colombia. The basic hypothesis was that differential economic opportunities by department play a central role in determining the spatial allocation of the population. Recently published data from the 1973 Population Census were used to test whether the rates of lifetime migration into Colombia's 23 departments are associated with those areas' labor market conditions. Male and female population movements were considered, both separately and together. For both sexes, the results sustain the empirical validity of the economic model of migration in the Colombian context.

Five specific hypotheses were confirmed by the available statistical evidence. They are:

1. Women in Colombia migrate at higher rates than men,
2. Women in Colombia are more responsive than men to economic opportunities associated with migration for sociological reasons; the economic incentives are greater for men.
3. High income areas have higher inmigration rates than low income areas.
4. Areas with fuller, more stable employment have higher rates of inmigration than do other areas.

5. Areas where the employment composition is relatively favorable have higher inmigration than areas with poorer job mixes.

Confirmation of the economic model of migration and the expected income hypothesis is important in any country. But in Colombia, evidence on the importance of economic factors as determinants of migration is particularly useful since some past work, particularly that of Schultz, has been interpreted incorrectly to the contrary.[21] The rapid urbanization of Bogotá and other major Colombian cities did not occur in a vacuum. It would be foolhardy at this juncture to even hazard a guess as to the excessiveness or insufficiency of migration and the consequent urbanization from a social point of view. However, it is warranted to conclude that this is but one more instance of the Colombian people shifting their economic energies to activities with higher private returns. (A skeptic need only look at the flow of financial and human resources into the drug trade to be convinced.) What development analysts and policymakers sometimes forget is that the population consists of human beings who repeatedly evaluate the optimality of their current situations and may decide to shift course if they believe the gains are large enough. Migration in Colombia is yet another area of human conduct that economic analysis helps elucidate.

Notes

This paper was written at Yale and Cornell Universities. The research was supported in part by the Rockefeller and Ford Foundations' Research Program on Population and Development Policy. Gary Moss, Judith Oder, and Se-Il Park did the computer work. Helena Jaramillo and Paul Schultz made helpful comments on an earlier draft. It is a pleasure to acknowledge the assistance of these institutions and individuals.

1. See, e.g., John B. Lansing and Eva Mueller, *The Geographic Mobility of Labor* (Ann Arbor; University of Michigan Institute for Social Research, 1967).
2. See Michael P. Todaro, “A model of labor migration and urban unemployment in less developed countries," *American Economic Review* 59, no. 2 (March 1969): 138-148; John R. Harris and Michael P. Todaro, “Migration, unemployment and development; A two sector analysis,” *American Economic Review* 60, no. 1 (March 1970); 126-142; George E. Johnson, “The structure of rural-urban migration models," *Eastern Africa Economic Review* 3, no. 1 (June 1971): 2128; and Gary S, Fields, “Rural-urban migration, urban unemployment and underemployment, and job search activity in LDCs,” *Journal of Development Economics* 2, no. 2 (June 1975): 165-187, among others. These extensions are surveyed in Michael P. Todaro, *Internal Migration in Developing Countries* (Geneva: International Labour Office, 1976).
3. The ordinary competitive model of migration holds that a wage differential between geographic labor markets would he eroded as workers move from the low wage to tile high wage market and firms move in the reverse direction. The equilibrium tendency is for wages to equalize. However, if wages in the high wage labor market do not fall, it is

the probability of employment that must adjust until *expected* incomes are equalized. Why wages do not fall in the high wage labor market is a matter of some discussion. Todaro emphasizes institutional factors; others (e.g., Joseph E. Stiglitz, “Alternative theories of wage determination and unemployment in LDCs: The labour turnover model,” *Quarterly Journal of Economics* 88 (May 1974): 2; and Joseph E. Stiglitz, “The efficiency wage hypothesis, surplus labour, and the distribution of income in LDCs," *Oxford Economic Papers* 28, no, 2 (July 1976) offer market explanations based on profit-maximizing behavior by firms.

4. Examples are Josef Cugler, "The impact of labour migration on society and economy in sub-Saharan Africa: Empirical findings and theoretical considerations," *African Social Research* 6 (December 1968); Wayne A. Cornelius, *Politics and the Migrant Poor in Mexico City* (Stanford, Calif.: Stanford University Press, 1975); and R. Paul Shaw, *Land Tenure and the Rural Exodus in Chile*, Colombia, Costa Rica, and Peru (Gainesville, Fla.: University Presses of Florida, 1976).
5. Joseph E. Potter, Myriam Ordonez, and A. R. Meacham, "The rapid decline in Colombian fertility," *Population and Development Review* 2, nos. 3-4 (September-December 1976): 509-528.
6. Lifetime migration information was published by the National Statistical Office, DANE; see Departamento Administrativo Nacional de Estadística (DANE), “Población, educación, ocupación, ingresos y fecundidad en Colombia 1973," *Boletín Mensual de Estadística* 289 (August 1975), Table 5. Because of the limitations in the published data, it was not possible to measure movements within departments from farms to towns, towns to towns, or towns to cities.

7. The census income question was: "What was your income in pesos last month?" Thus, the data arc for gross income; labor earnings cannot lie distinguished.
8. The employment probability variables are broken down by sex; the employment composition variables are not. All job opportunity variables were taken from special tabulations provided by DANE.
9. Todaro (1976), cited in note 2.
10. The phenomena of temporary and permanent migration in developing countries arc analyzed in depth by Joan M. Nelson, “Sojourners versus new urbanites: Causes and consequences of temporary versus permanent cityward migration in developing countries,” *Economic Development and Cultural Change* 24, no. 4 (July 1976): 721-757.
11. The correlation coefficient is a measure of “goodness of fit.” If men's and women's migration rates matched exactly, the correlation coefficient would be 1.0. The observed value, 0.99, means they match almost exactly.
12. Of course, this still may be taking place *within* departments, which the available data cannot reveal.
13. All the regressions reported here are in straight linear form. As a cheek on the appropriateness of this procedure, I reran them with a double-log specification. All the results were substantially similar, so are not reported here.
14. For example, the regression relationship for unemployment implies that an increase in an area’s unemployment rale from 10 percent to 15 percent would reduce the predicted in-migration rate from an estimated 22.1 percent to an estimated 19.2 percent.

15. The available computer program calculated significance levels for a two-tail test. A one-tail test is more appropriate. The one-tail significance levels are higher, i.e., more significant.
16. This statement holds for the two most commonly-used measures: the unemployment rate and the employment-to- population ratio. The continued insignificance of the other two variables—mean work year and proportion who worked a full year—is open to a variety of interpretations. My suspicion is that it is largely due to measurement error. People were asked in October: "How many months were you employed in a paid job or in a family business during this year?" I would guess that full year workers would not know whether the right answer is nine, ten, or twelve. And so too for census enumerators. Uncertainty on how to respond may well have rendered the reported values largely useless.
17. At the 95 percent confidence level, one-tail test. This result reflects the earlier finding that the ordinary correlation coefficients are not statistically significant though the partial correlation coefficients are,
18. This is not the place to go into the reason for different sex-specific employment conditions. The results are sufficiently tantalizing to warrant thorough analysis in a separate study.
19. The estimated income elasticities of migration are also somewhat higher for women than for men. From the double-log regressions, the estimated elasticities were 1.78 and 1.72 for women (equations 13 and 15, respectively) and 1.63 and 1.57 for men (equations 14 and 16. respectively).
20. I have no reason to believe that the losses are appreciably different for men and women.

21. T. Paul Schultz, "Rural-urban migration in Colombia," *Review of Economics and Statistics* 53, no. 2 (May 1971); and Richard R. Nelson, T. Paul Schultz, and Robert L. Slighton, *Structural Change in a Developing Country: Colombia's Problems and Prospects* (Princeton: Princeton University Press, 1971), reported that the *violencia* which plagued Colombia in the 1950s had a substantial impact on migration flows. This does not deny the importance of economic factors on migration decisions since (1) social instability in the countryside greatly reduced economic activity there, and (2) many who left, whether for economic or non-economic reasons, chose a particular destination on the basis of available economic opportunities.

Figure 1

Figure 1
Sex Differences
in Migration Rates

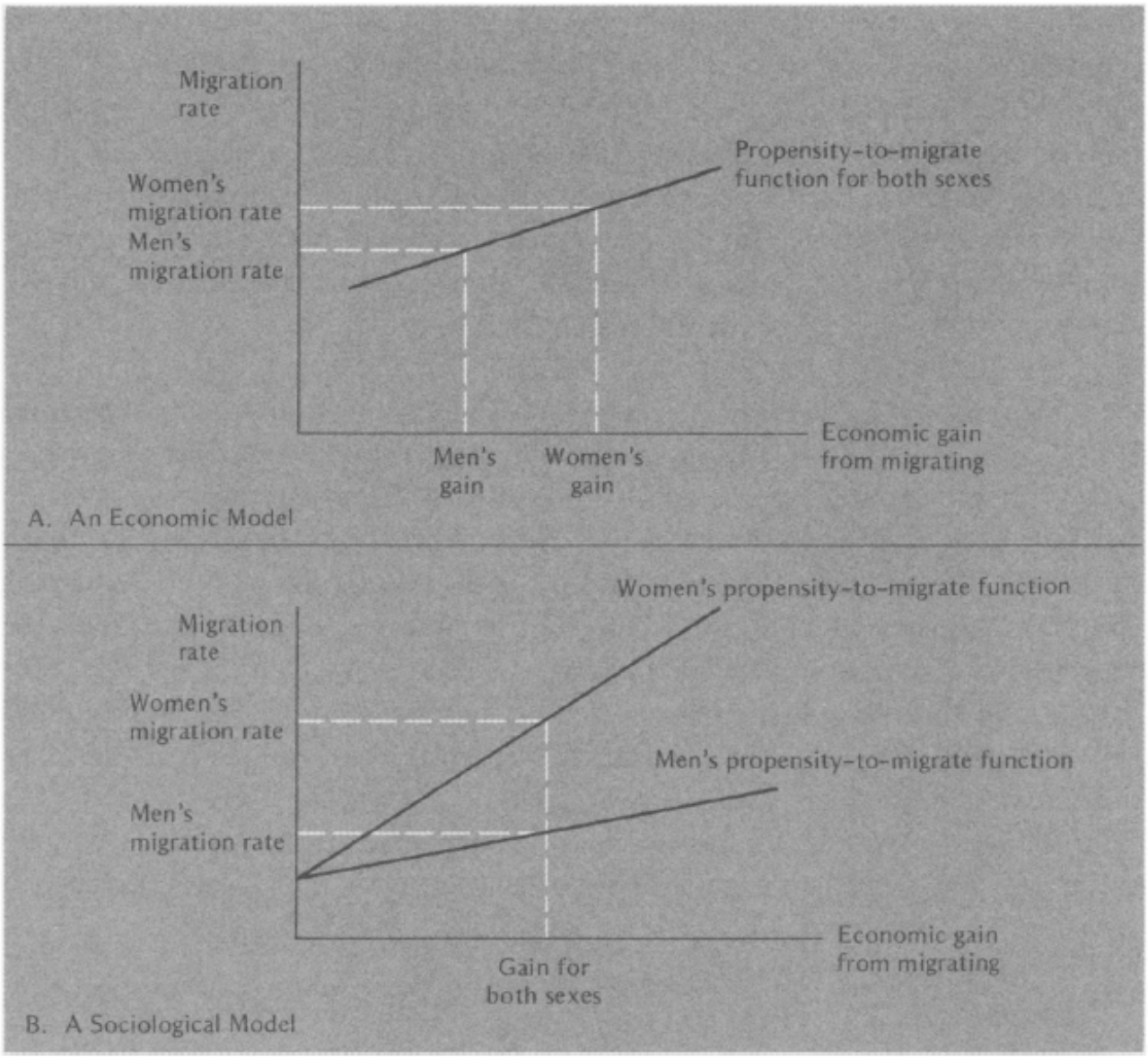

Figure 2

Figure 2
Scattergram of Total Migration Rate
By Average Monthly Income

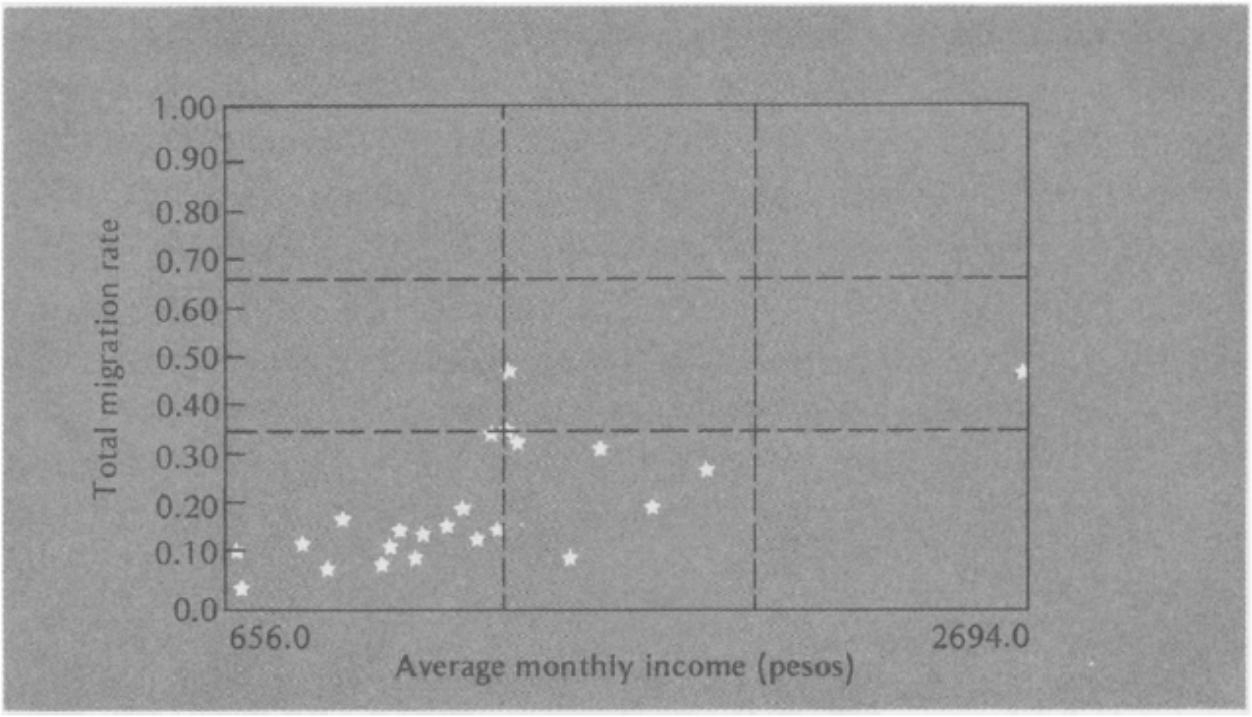

Figure 3

Figure 3
Scattergrams of Total Migration Rate by Four Alternative Measures of Employment Probability

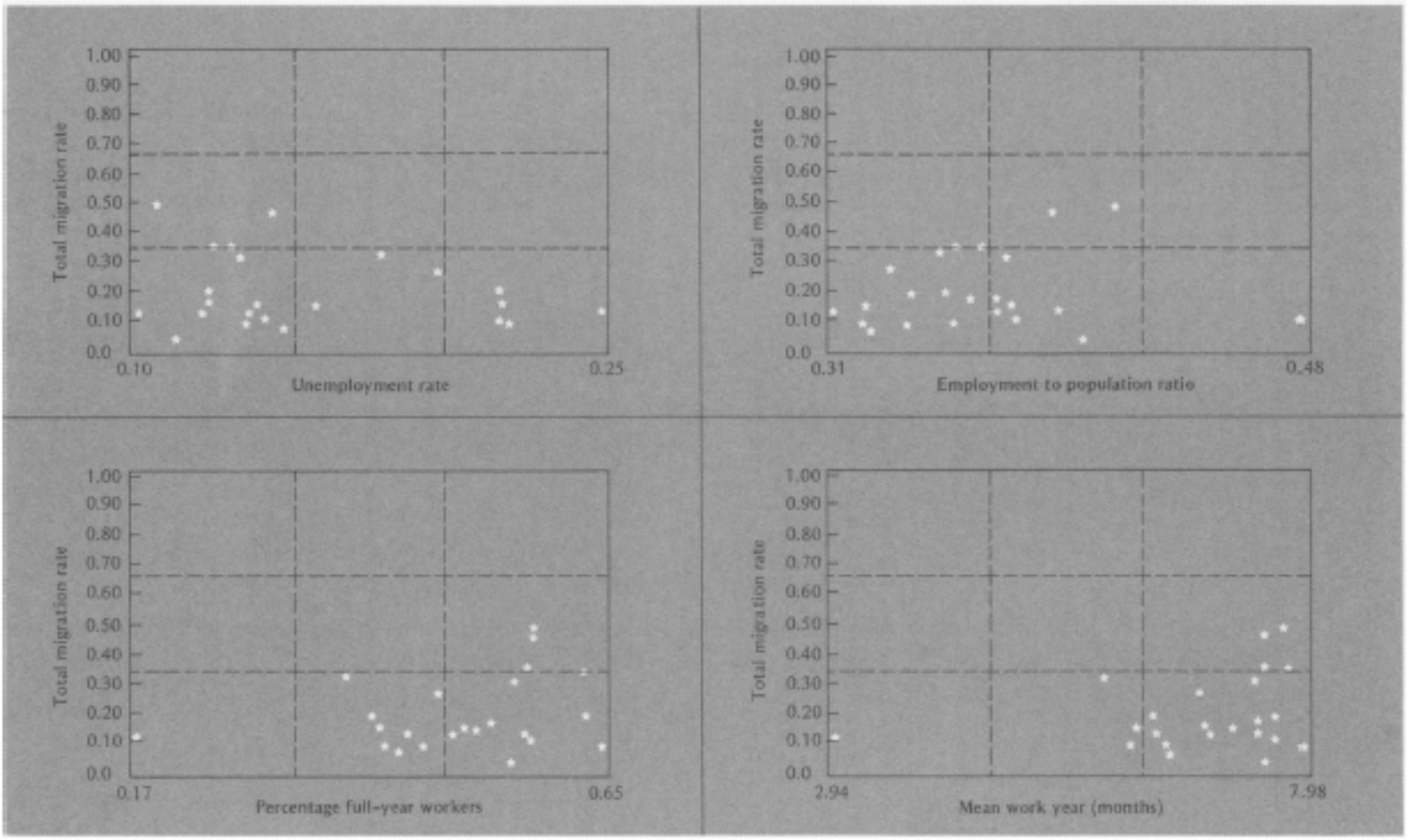

Figure 4

Figure 4
Scattergrams of Total Migration Rate by Three Measures of Employment Mix

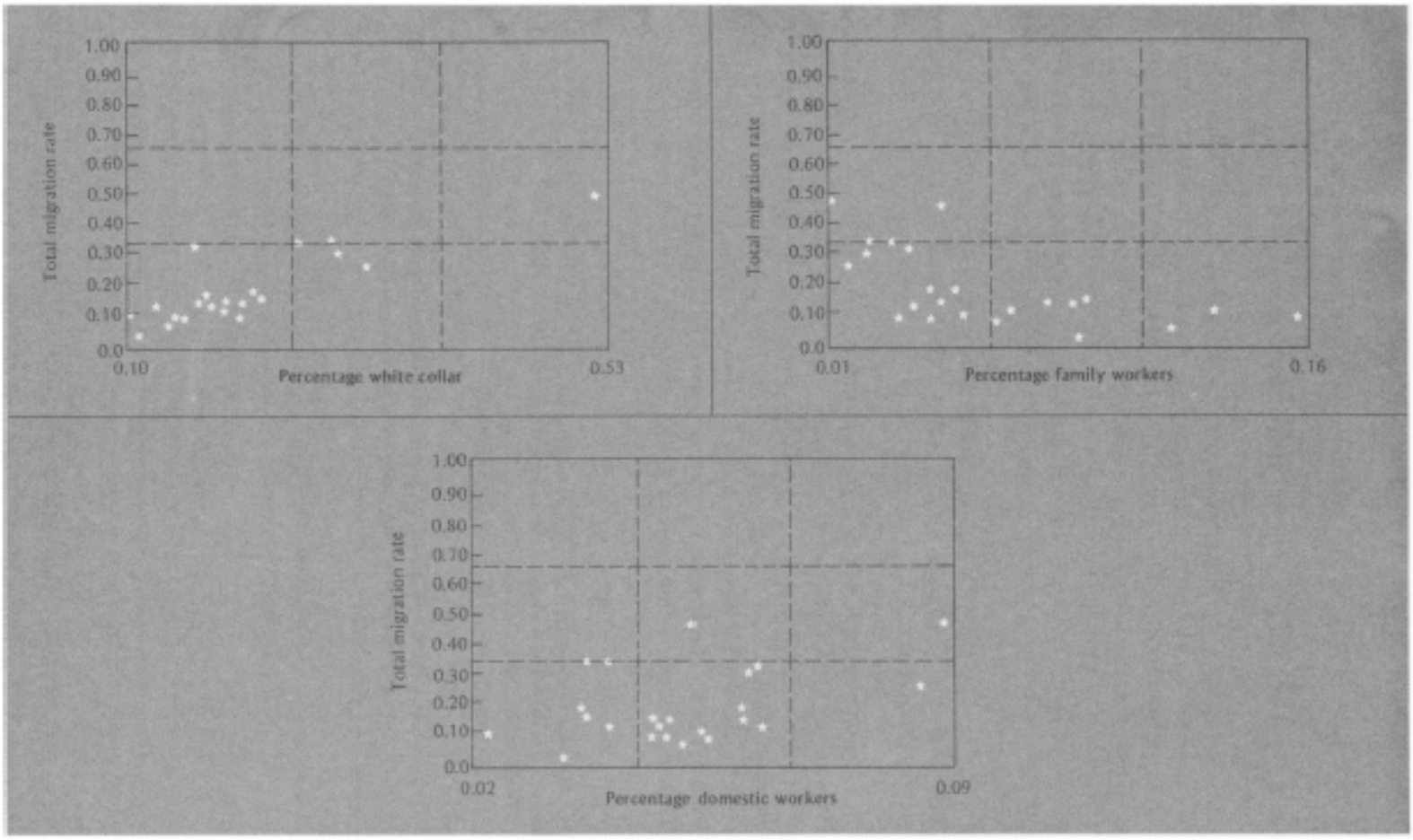

Figure 5

Figure 5
Sex Differences in Migration Behavior in Colombia, 1973

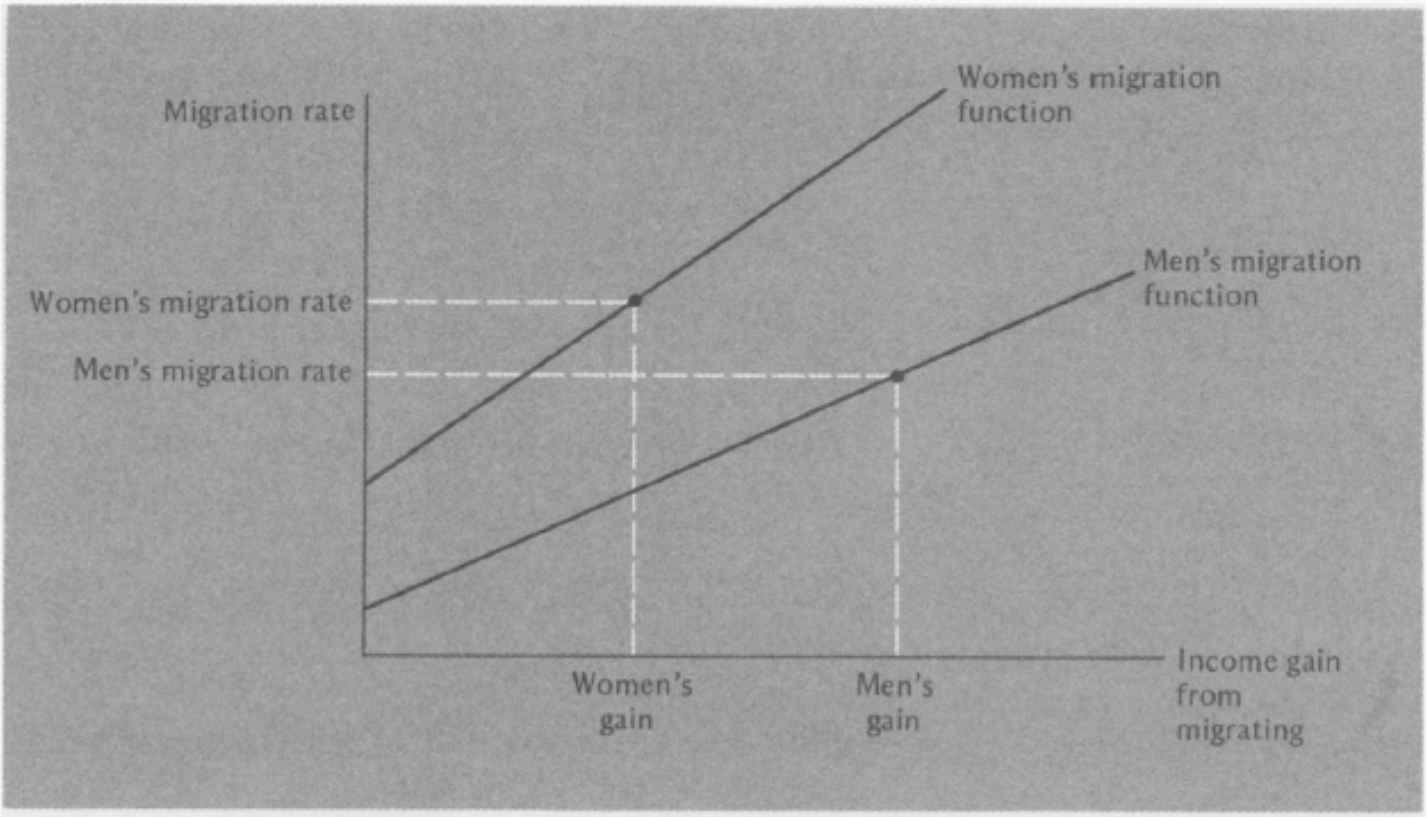

Table 1

Table 1
Lifetime Migration Rates by Department in Colombia, Total and by Sex, 1973

Both Sexes		Males		Females	
Department	Rate	Department	Rate	Department	Rate
Bogota	.49	Meta	.47	Bogota	.51
Meta	.47	Bogota	.45	Meta	.47
Quindio	.35	Quindio	.34	Quindio	.35
Risaralda	.34	Risaralda	.33	Risaralda	.35
Cesar	.32	Cesar	.32	Cesar	.32
Valle	.30	Valle	.29	Valle	.31
Atlantico	.26	Atlantico	.23	Atlantico	.29
La Guajira	.19	La Guajira	.19	La Guajira	.19
Caldas	.17	Caldas	.17	Caldas	.18
Cundinamarca	.15	Cundinamarca	.15	Cundinamarca	.16
Huila	.14	Huila	.15	Bolivar	.14
Tolima	.14	Tolima	.14	Tolima	.14
Bolivar	.13	Bolivar	.13	Huila	.13
Magadalena	.13	Magadalena	.13	Magadalena	.13
Cauca	.12	Cauca	.12	Cauca	.12
Choco	.11	Choco	.12	N. de Santander	.11
N. de Santander	.11	N. de Santander	.11	Santander	.11
Santander	.11	Santander	.11	Choco	.10
Antioquia	.08	Antioquia	.08	Antioquia	.08
Cordoba	.08	Cordoba	.08	Sucre	.08
Sucre	.08	Boyaca	.07	Boyaca	.07
Boyaca	.07	Sucre	.07	Cordoba	.07
Narino	.03	Narino	.02	Narino	.03

NOTES: Departments are rank-ordered. Lifetime migration rates are defined as the number now living in a given municipality who have changed municipalities during their lifetimes divided by the number living in that municipality at the time of the census (1973). For example, of the population residing in Bogota in 1973, 49 percent were born elsewhere.

Table 2

Table 2
Hypothesized Signs and Observed Coefficients Between Total Migration Rate and Selected Measures of Employment Probability, Colombia, 1973

Code Name	Variable Description	Hypothesized Sign of Correlation	Observed Value of Correlation
U	Unemployment rate	—	—.19 (.19)[a]
PEMP	Proportion of population employed	+	+.16 (.23)
PFULL	Proportion of workers who had worked in every month of 1973 up to the time of the census (Oct.)	+	+.27 (.11)
MEANWKYR	Mean work year among those who reported number of months worked in 1973 up to the time of the census (Oct.) (maximum = 10)	+	+.26 (.12)

[a] Significance level.

Table 3

Table 3
Hypothesized Signs and Observed Correlation Coefficients Between Total Migration Rate and Selected Measures of Employment Mix, Colombia, 1973

Code Name	Variable Description	Hypothesized Sign of Correlation	Observed Value of Correlation
PWTCLR	Proportion of workers employed in white-collar jobs	+	+.77 (.00001)[a]
PFAMWKR	Proportion of workers employed as unpaid family workers	—	—.56 (.003)
PDOMWKR	Proportion of workers employed as domestic workers	?	+.42 (.02)

[a] Significance level.

Table 4

Table 4
Matrix of Correlation Coefficients Among Sex-Specific Migration Rates and Sex-Specific Economic Variables, 23 Departments in Colombia, 1973

	TOTMIGM	TOTMIGF	INCTOTM	INCTOTF	UM	UF	PEMPM	PEMPF
TOTMIGM	1.000	.992	.655	.513	—.117	—.337	.228	.316
TOTMIGF		1.000	.710	.554	—.091	—.341	.213	.335
INCTOTM			1.000	.782	.204	—.153	—.083	.410
INCTOTF				1.000	.311	.166	—.134	—.115
UM					1.000	.818	—.916	—.294
UF						1.000	—.738	—.671
PEMPM							1.000	.228
PEMPF								1.000
Mean	.186	.193	1316	1073	.118	.273	.402	.108
Standard Deviation	.121	.131	444	226	.031	.076	.031	.035

NOTE: The value of, for example, .782 in column 4, line 3, means that the average incomes of males in the various Colombian departments are correlated positively with the average incomes of females in those departments and that the degree of correlation is +0.782 on a scale from +1.00 (perfect positive correlation) to —1.00 (perfect negative correlation).